

50. Maximum deflection of a

- (A) Cantilever beam carrying a concentrated load W at its free end is $WL^3/3EI$
- (B) Simply supported beam carrying a concentrated load W at mid-span is $WL^3/48EI$
- (C) Cantilever beam, carrying a uniformly distributed load over span is $WL^3/8EI$
- (D) All the above

51. If the thickness of plate is negligible when compared to the diameter of the cylindrical, then it is called _____

- (a) Thick cylinder
- (b) Thin cylinder
- (c) Hoop cylinder
- (d) Circumferential cylinder

52. The dimension of strain is?

- (a) LT^{-2}
- (b) N/m^2
- (c) N
- (d) Dimensionless

53. Find the elongation of an steel rod of 100mm length when it is subjected to a tensile strain of 0.005?

- (a) 0.2mm
- (b) 0.3mm
- (c) 0.5mm
- (d) 0.1 mm

54. Calculate the Strain energy stored in a body of stress 0.0366 N/mm^2 . The cross sectional area is 60 m^2 and length of body is 1 m. Take $E = 2 \times 10^5 \text{ N/mm}^2$.

- (a) 0.2009 Nmm
- (b) 0.0416 Nmm
- (c) 0.0987 Nmm
- (d) 0.1316 Nmm

55. Which law is also called as the elasticity law?

- (a) Bernoulli's law
- (b) Stress law
- (c) Hooke's law
- (d) Poisson's law

56. The materials which have the same elastic properties in all directions are called _____

- (a) Isotropic
- (b) Brittle
- (c) Homogeneous
- (d) Hard

57. How the elastic constants E and K are related?

- (a) $E = 2K(1 - 2\mu)$
- (b) $E = 3K(1 - 2\mu)$
- (c) $E = 2K(1 - \mu)$
- (d) $E = K(1 - 2\mu)$

58. Which of the following is true if the value of Poisson's ratio is zero?

- (a) The material is rigid
- (b) The material is perfectly plastic
- (c) The longitudinal strain in the material is infinite
- (d) There is no longitudinal strain in the material

59. The stress which acts in a direction perpendicular to the area is called _____

- (a) Shear stress
- (b) Normal stress
- (c) Thermal stress
- (d) None of the mentioned

60. Which of these are types of normal stresses?

- (a) Tensile and compressive stresses
- (b) Tensile and thermal stresses
- (c) Shear and bending
- (d) Compressive and plane stresses

61. Which stress comes when there is an eccentric load applied?

- (a) Shear stress
- (b) Bending stress
- (c) Tensile stress
- (d) Thermal stress

62. What is the expression of the bending equation?

- (a) $M/I = \sigma/y = E/R$
- (b) $M/R = \sigma/y = E/I$
- (c) $M/y = \sigma/R = E/I$
- (d) $M/I = \sigma/R = E/y$

63. Consider a 250mmx15mmx10mm steel bar which is free to expand is heated from 15°C to

40°C. What will be developed?

- (a) Compressive stress
- (b) Tensile stress
- (c) Shear stress
- (d) No stress

64. When equal and opposite forces applied to a body, tend to elongate it, the stress so produced, is called _____

- (a) Shear stress
- (b) Compressive stress
- (c) Tensile stress
- (d) Transverse stress

65. A steel bar of 40mm x 40mm square cross-section is subjected to an axial compressive load

of 200kN. If the length of the bar is 2m and $E=200\text{GPa}$, the change in length of the bar will be

- (a) 1.25mm
- (b) 2.70mm
- (c) 4.05mm
- (d) 5.40mm

66. The thermal stress is a function of _____

P. Coefficient of linear expansion

Q. Modulus of elasticity

R. Temperature rise

(a) P and Q

(b) Q and R

(c) Only P

(d) Only R

67. A steel rod is heated from 25 to 250 degree Celsius. Its coefficient of thermal expansion is

10^{-6} and $E = 100 \text{ GN/m}^2$. If the rod is free to expand, the thermal stress developed in it is:

(a) 100 kN/m^2

(b) 240 kN/m^2

(c) Zero

(d) Infinity

68. Which test is conducted to measure the ability of a material to resist scratching,

abrasion,

deformation and indentation?

(a) Creep test

(b) Fatigue test

(c) Hardness test

(d) Compression test

69. Modulus of elasticity is the ratio of

(a) Stress to strain

(b) Stress to original length

(c) Deformation to original length

(d) All of these

70. When a solid shaft is subjected to torsion, the shear stress induced in the shaft at its center is

(a) Zero

(b) Minimum

(c) Maximum

(d) Average

71. Helical springs are also called

(a) Elliptical spring

(b) Torsion spring

(c) Bending spring

(d) None of the above 72. When a closely coiled spring is subjected to an axial load, it is said to be under

(a) Bending

(b) Shear

(c) Torsion

(d) All of these

73. Pitch of the spring coil can be seen in

(a) Leaf spring

- (b) Closely coiled spring
- (c) Open coiled spring
- (d) Helical spring

74. When shear force at a point is zero, then bending moment at that point will be

- (a) Zero
- (b) Minimum
- (c) Maximum
- (d) Infinity.

75. If a cantilever beam is subjected to a point load at its free end, then the shear force under the point load is

- (a) Zero
- (b) less than the load
- (c) Equal to the load
- (d) more than the load.

Question No. 76

The coefficient of friction depends on

- (A) Area of contact
- (B) Shape of surfaces
- (C) Strength of surfaces
- (D) Nature of surface

Answer: Option D

Question No. 77

A closely coiled helical spring of radius R , contains n turns and is subjected to an axial load W . If the radius of the coil wire is r and modulus of rigidity of the coil material is C , the stress developed in the helical spring is

- (A) $WR/\pi r^3$
- (B) $2WR/\pi r^3$
- (C) $2WR/\pi r^2$
- (D) $4WR/\pi r^2$

Answer: Option B

Question No. 78

The intensity of direct longitudinal stress in the cross-section at any point distant r from the neutral axis, is proportional to

- (A) r
- (B) $1/r$
- (C) r^2
- (D) $1/r^2$

Answer: Option A

Question No. 79

The coefficient of friction depends upon

- (A) Nature of surfaces
- (B) Area of contact

(D) Both (a) and (b) Answer: Option D

Question No. 97

Tangent of angle of friction is equal to

- (A) Kinetic friction
- (B) Limiting friction
- (C) Angle of repose
- (D) Coefficient of friction Answer: Option D

Question No. 98

The type of butt joints in common use, is:

- (A) Single inverted V-butt joint
- (B) Double V-butt joint
- (C) Double U-butt joint
- (D) Single V-butt joint Answer: Option A

Question No. 99

For keeping the stress wholly compressive the load may be applied on a circular column anywhere within a concentric circle of diameter

- (A) $d/2$
- (B) $d/3$
- (C) $d/4$
- (D) $d/8$

Answer: Option C

Question No. 100

The C.G. of a solid hemisphere lies on the central radius $3r$

- (A) At distance from the plane base $3r$
- (B) At distance from the plane base $3r$
- (C) At distance from the plane base $3r$
- (D) At distance from the plane base or Answer: Option D.

101. The point of contra flexure is a point where

- (a) Shear force changes sign
- (b) Bending moment changes sign
- (c) Shear force is maximum
- (d) Bending moment is maximum.

102. Shear force at inflection point will be

- (a) Zero
- (b) Minimum
- (c) Maximum
- (d) Infinity.

103. At sections, where the bending moment, is such that it tends to bend the beam at that point to a curvature having concavity at the top is known as

- (a) Simple bending moment

- (b) Sagging
- (c) Hogging
- (d) Infinity.

104. Aircraft wings is an example of

- (a) Beam which is fixed at one end and overhanging at another end
- (b) Simply supported beam
- (c) Overhanging beam
- (d) Cantilever beam

105. The maximum slope of a cantilever carrying a point load at its free end is at the

- (a) Fixed end
- (b) Center of span
- (c) Free end
- (d) None of these

106. The total change in length of a bar of different sections is equal to the

- (a) Sum of changes in the lengths of different sections
- (b) Average of changes in the lengths of different sections
- (c) Difference of changes in the lengths of different sections
- (d) None of these

107. A composite section contains 4 different materials. The stresses in all the different materials will be

- (a) Zero
- (b) Equal
- (c) Different
- (d) In the ratio of their areas.

108. A rod is enclosed centrally in a tube and the assembly is tightened by rigid washers. If the assembly is subjected to a compressive load, then

- (a) rod is subjected to a compressive load
- (b) Tube is subjected to a compressive load
- (c) Both are subjected to a compressive load
- (d) Rod is subjected to a compressive load, while the tube is subjected to a tensile load.

109. When the temperature of a body is increased, the stress induced will be

- (a) Tension
- (b) Compression
- (c) Both 'a' and 'b'
- (d) Neither 'a' nor 'b'

110. Poisson's ratio is denoted by.

- (a) E
- (b) $1/m$
- (c) K
- (d) C

111. The total strain energy stored in a body is known as

- (a) Impact energy
- (b) Resilience
- (c) Proof resilience
- (d) Modulus of resilience

112. Strain energy is the

- (a) Maximum energy which can be stored in a body
- (b) Energy stored in a body when stressed in the elastic limit
- (c) Energy stored in a body when stressed up to the breaking point
- (d) None of the above

113. Does the value of stress in each section of a composite bar is constant or not?

- (a) It changes in a relationship with the other sections as well
- (b) It changes with the total average length
- (c) It is constant for every bar
- (d) It is different in every bar in relation with the load applied and the cross sectional area

114. At _____ the shearing stress in a beam are maximum.

- (a) Extreme fibers
- (b) Modulus of section
- (c) Neutral axis
- (d) Along the cross-sectional area

115. Shear stress distribution over rectangular section will be _____

- (a) Parabolic
- (b) Elliptical
- (c) Triangular
- (d) Trapezoidal

116. Circumferential stress is same as of _____

- (a) Hoop stress
- (b) Longitudinal stress
- (c) Transverse stress
- (d) Phreatic stress

117. Hogging is _____

- (a) Negative bending moment
- (b) Positive shear force
- (c) Positive bending moment
- (d) Negative shear force

118. Hinged supports offers vertical and _____ reaction.

- (a) Horizontal
- (b) Moment
- (c) Rotation
- (d) Couple

119. What is variation in SFD, if the type of loading in the simply supported beam is U.D.L is

- (a) Rectangle
- (b) Linear
- (c) Trapezoidal
- (d) Parabolic

120. In SFD, vertical lines are for _____

- (a) Point loads
- (b) UDL
- (c) UVL
- (d) LDP

121. Which of the following method is not used for determining slope and deflection at a point?

- (a) Moment area method
- (b) Double integration method
- (c) Isocheimal method
- (d) Macaulay's method

122. The slope is denoted by _____

- (a) k
- (b) y
- (c) i
- (d) c

123. A cylindrical section having no joint is known as _____

- (a) Proof section
- (b) Seamless section
- (c) Target section
- (d) Mown section

124. Mathematically, strain energy = _____

- (a) Power
- (b) Work done
- (c) Young's Modulus
- (d) Energy

125. Twisting moment is a product of _____ and the radius.

- (a) Direction
- (b) Velocity
- (c) Force
- (d) Acceleration

Question No. 126

The slenderness ratio of a vertical column of a square cross-section of 2.5 cm sides and 300 cm length, is

- (A) 200
- (B) 240
- (C) 360
- (D) 416

Answer: Option D

Question No. 127

The stress necessary to initiate yielding, is considerably

- (A) More than that necessary to continue it
 - (B) Less than that necessary to continue it
 - (C) More than that necessary to stop it
 - (D) Less than that necessary to stop it
- Answer: Option A

Question No. 128

Which of the following is not a scalar quantity?

- (A) Time

While testing a cast iron beam ($2.5\text{ cm} \times 2.5\text{ cm}$) in section and a metre long simply supported at the ends failed when a 100 kg weight is applied at the centre. The maximum stress induced is:

- (A) 960 kg/cm^2
- (B) 980 kg/cm^2
- (C) 1000 kg/cm^2
- (D) 1200 kg/cm^2 Answer: Option A

Question No. 199

Simple bending equation is

- (A) $M/I = R/E = F/Y$
- (B) $I/M = E/R = Y/F$
- (C) $M/I = E/R = F/Y$
- (D) $M/I = R/E = Y/F$

Answer: Option C

Question No. 200

The algebraic sum of moments of the forces forming couple about any point in their plane is

- (A) Equal to the moment of the couple
- (B) Constant
- (C) Both of above are correct
- (D) Both of above are wrong Answer: Option A

201. Torque is _____ moment.

- (a) Twisting
- (b) Shear
- (c) Bending
- (d) Couple

202. What are the units of torsional rigidity?

- (a) Nmm^2
- (b) N/mm
- (c) N-mm
- (d) N

203. The shear stress at the outer surface of hollow circular section is _____

- (a) Zero
- (b) Maximum
- (c) Minimum
- (d) Can't determined

204. The hollow shaft will transmit greater _____ than the solid shaft of the same weight.

- (a) Bending moment
- (b) Shear stress
- (c) Torque
- (d) Sectional Modulus

205. In fletched beams _____ remains same for both materials.

- (a) Stress
- (b) Strain
- (c) Section modulus
- (d) Young's modulus

206. The cylinder has a tendency to split up along _____ due to circumferential stress.

- (a) Area
- (b) Radius
- (c) Diameter
- (d) Length

207. Which of the following is also known as axial stress?

- (a) Shear stress
- (b) Longitudinal stress
- (c) Bending stress
- (d) Hoop stress

208. Calculate the Strain energy that can be stored in a body to be pulled with 100 N/mm^2 stress

- (f) and $E = 2 \times 10^5 \text{ N/mm}^2$.
- (a) 0.9 kNm
- (b) 0.05 kNm
- (c) 0.87 kNm
- (d) 0.54 kNm

209. Which of the following is not base unit?

- (a) Area
- (b) Length
- (c) Time
- (d) Temperature

210. Strain is defined as the ratio of

- (a) Change in volume to original volume
- (b) Change in length to original length
- (c) Change in cross-sectional area to original cross-sectional area
- (d) Any one of the above

211. Hooke's law holds well up to

- (a) Yield point
 - (b) Limit of proportionality
 - (c) Breaking point
 - (d) Elastic limit
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212. Young's modulus is defined as the ratio of

- (a) Volumetric stress and volumetric strain
- (b) Lateral stress and lateral strain
- (c) Longitudinal stress and longitudinal strain
- (d) Shear stress to shear strain

213. If a part is constrained to move and heated, it will develop

- (a) Principal stress
- (b) Tensile stress
- (c) Compressive stress
- (d) Shear stress

214. Poisson's ratio is defined as the ratio of

- (a) Longitudinal stress and longitudinal strain
- (b) Longitudinal stress and lateral stress
- (c) Lateral stress and longitudinal stress
- (d) Lateral stress and lateral strain

215. The ratio of direct stress to volumetric strain in case of a body subjected to three mutually perpendicular stresses of equal intensity, is equal to

- (a) Young's modulus
- (b) Bulk modulus
- (c) Modulus of rigidity
- (d) Modulus of elasticity

216. Longitudinal stress in a thin cylinder is

- (a) Equal to the hoop stress
- (b) Twice the hoop stress
- (c) Half of the hoop stress
- (d) one-fourth of hoop stress

217. Deformation per unit length in the direction of force is known as

- (a) Strain
- (b) Lateral strain
- (c) Linear strain
- (d) Linear stress

218. The unit of Young's modulus is

- (a) kN
- (b) N/cm
- (c) N
- (d) N/mm²

219. Modulus of rigidity is defined as the ratio of

- (a) Longitudinal stress and longitudinal strain
- (b) Volumetric stress and volumetric strain
- (c) Lateral stress and lateral strain
- (d) Shear stress and shear strain**

220. If the radius of wire stretched by a load is doubled, then its Young's modulus will be

- (a) Doubled
- (b) Halved
- (c) Become four times
- (d) Remain unaffected.**

221. The intensity of stress which causes unit strain is called

- (a) Unit stress
- (b) Bulk modulus
- (c) Modulus of rigidity
- (d) Modulus of elasticity**

222. The stress developed in a material at breaking point in extension is called

- (a) Breaking stress**
- (b) Fracture stress
- (c) Yield point stress
- (d) Ultimate tensile stress

223. When it is indicated that a member is elastic, it means that when force is applied, it will

- (a) Not deform
- (b) Be safest
- (c) Stretch**
- (d) Not stretch

224. A boiler shell 200 cm diameter and plate thickness 1.5 cm is subjected to internal pressure of 1.5 MN/m, and then the hoop stress will be 30 MN/m²

- (a) 50 MN/m²
- (b) 100 MN/m²
- (c) 200 MN/m²**
- (d) 150 MN/m²

225. The value of shear stress which is induced in the shaft due to the applied couple varies

- (a) From maximum at the center to zero at the circumference
- (b) From zero at the center to maximum at the circumference**
- (c) From maximum at the center to mini-mum at the circumference
- (d) From minimum at the center to maxi-mum at the circumference

Question No. 226

The moment diagram for a cantilever carrying a concentrated load at its free end, will be

- (A) Triangle
- (B) Rectangle